

---

## PART I - ADMINISTRATIVE

### Section 1. General administrative information

Title of project

John Day Watershed Restoration

---

BPA project number: 9801800

Contract renewal date (mm/yyyy):

☐ Multiple actions?

Business name of agency, institution or organization requesting funding

Confederated Tribes of the Warm Springs Reservation of Oregon

---

Business acronym (if appropriate)

CTWSRO

---

Proposal contact person or principal investigator:

Name Shaun W. Robertson

Mailing Address P.O. Box 480

City, ST Zip Canyon City, OR 97820

Phone (541) 575-4212

Fax (541) 575-4212

Email address ctwsjdbo@eoni.com

NPPC Program Measure Number(s) which this project addresses

5.4D.8, 7.8H.2, 7.8G.2, 7.10, 10.2.C, 7.8.2

---

FWS/NMFS Biological Opinion Number(s) which this project addresses

---

Other planning document references

John Day Basin Water Optimization Projects, Phase III (BOR 1996); John Day River Water Conservation Demonstration Project, Phase III, Planning Aid Memorandum (USFWS 1996); Stream Restoration Program for the Upper Mainstem of the John Day River (BOR 1992); Upper John Day River Basin Master Water Plan Working Paper (BOR 1990); Wy-Kan-Ush-Me Wa-Kush-Wit (CRITFC 1995).

---

Short description

Implement protection and restoration actions to improve water quality, water quantity, and fish habitat, and eliminate passage barriers for anadromous and resident fish.

---

Target species

Spring chinook salmon, summer steelhead trout, pacific lamprey, redband trout, westslope cutthroat trout, and bull trout.

---

### Section 2. Sorting and evaluation

Subbasin

John Day

---

### Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input checked="" type="checkbox"/> Anadromous fish <input checked="" type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input type="checkbox"/> Multi-year (milestone-based evaluation) <input checked="" type="checkbox"/> Watershed project evaluation	<input checked="" type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input type="checkbox"/> Research & monitoring <input checked="" type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

### Section 3. Relationships to other Bonneville projects

***Umbrella / sub-proposal relationships.*** List umbrella project first.

Project #	Project title/description

#### ***Other dependent or critically-related projects***

Project #	Project title/description	Nature of relationship

### Section 4. Objectives, tasks and schedules

#### ***Past accomplishments***

Year	Accomplishment	Met biological objectives?
1995	Completion of Phase I implementation activities	Eliminated passage barriers and impediments, improved stream flow through increased irrigation efficiencies, improved water quality by lowering irrigation return flow temperatures.
1996	Completion of Phase II implementation activities.	Eliminated passage barriers and impediments, improved stream flow through increased irrigation efficiencies and changed point of diversion.
1997	Completion of Phase III implementation activities.	Eliminated passage barriers and impediments, improved stream flow through increased irrigation efficiencies and improved water quality through warm-water irrigation reuse.
1998	Completion of Phase IV implementation activities.	Eliminated passage barriers and impediments, improved stream flow through increased efficiencies, upgraded

		conveyance systems, and changes in points of diversion.
--	--	---

### ***Objectives and tasks***

<b>Obj 1,2,3</b>	<b>Objective</b>	<b>Task a,b,c</b>	<b>Task</b>
1	Increase in-season, stream flows through a combination of irrigation efficiency, riparian recovery, and other irrigation facility upgrades.	a	Smokey Creek Irrigation Reorganization: replace three push-up dams with pumping stations, replace the open conveyance system with below ground mainline, and convert from flood to sprinkler irrigation.
		b	Mascall Irrigation Reorganization: Reduce water loss in the supply system by upgrading the open ditches to a below-ground pipe.
		c	Kilpatrick Pipeline: Reduce water loss through the supply system by installing 450' of pipe joining the north and south ditches and increasing efficiencies by combining two ditch systems and eliminating one diversion.
		d	Rudishauser Pumping Station: Substitute late season irrigation rights in a tributary stream with water from the mainstem using a pumping station and below-ground conveyance system.
		e	Mullin Diversion: Replace the open conveyance system with approximately 1400' of buried mainline with risers, wheel line, and handline to replace the inefficient wild flood irrigation system.
		f	Mullin Pumping Station and Irrigation Reorganization: Move point of diversion 2 1/2 miles closer to point of application, thereby effectively leaving 5.75 cfs instream for the additional length of stream.
		g	All Projects (except return flow cooling): Provide for diversion to legal rate and duty; reduce water loss due to seepage and spillage at the diversions and eliminate the need for misappropriation of water due to inefficiencies at the diversion point.
2	Improve water quality by reducing stream bank instability, sedimentation, and bedload movement from annual construction of diversion dams.	a	Smokey Creek (3), Rudishauser, and Mullin: Replace annually constructed push-up diversions with pumping stations.
		b	Mascall and St. Clair Diversions (2): Replace annually constructed push-up dams with permanent diversions.
		d	Mascall, Kilpatrick, and Rudishauser: Replace annually constructed irrigation ditch crossings on tributary streams with permanent crossings.

		e	Holmes Diversion: Replace a push-up dam constructed during low flow periods and years with a permanent sill and lay flat stanchions.
		f	All Projects: reshape stream banks and reseed; plant trees and shrubs where necessary; rebuild riparian corridor fences where appropriate.
3	Reduce or eliminate migratory delays from passage impediments.	a	Smokey Creek (3), Rudishauser, and Mullin: Replace annually constructed push-up diversions with permanent pumping stations.
		b	Mascall, St. Clair (2): Replace annually constructed push-up dams on the mainstem with permanent structures.
		c	Kilpatrick Pipeline: Retire a push-up dams on a tributary stream, install an intake structure in the north ditch, and pass the pipeline underneath the tributary stream in a permanent crossing.
		d	Mascall, Kilpatrick, and Rudishauser: Replace annually constructed irrigation ditch crossings on tributary streams with permanent crossings.
		e	Holmes Diversion: Replace a push-up diversion constructed during low-flow and low-water year periods with a permanent sill and lay-flat stanchions.
4	Improve water quality by reducing water temperatures of return flows and eliminating mixing at stream-ditch crossings.	a	Mascall Irrigation Reorganization & Kilpatrick Pipeline: Replace annually constructed irrigation ditch crossings on a tributary streams with permanent crossings to eliminate mixing of warm irrigation water with cooler tributary flows.
		b	Ediger & Vidondo Return Flow Cooling: Replace failing wooden return flow systems with perforated, underground pipes to cool return flows to river.
5	Improve riparian condition and extent following removal of annual impacts to streambanks.	a	All Projects: Shape streambanks, plant grasses and shrubs, and rebuild existing riparian corridor fences.
6	Implement annual monitoring program.	a	All Projects: collect and analyze project information data to evaluate effectiveness of project construction and operation.

### **Objective schedules and costs**

<b>Obj #</b>	<b>Start date mm/yyyy</b>	<b>End date mm/yyyy</b>	<b>Measureable biological objective(s)</b>	<b>Milestone</b>	<b>FY2000 Cost %</b>
1	5/2000	12/2000	Enhanced stream flow, reduced late-summer stream temperatures.	Installation and operation of project facilities.	30.00%
2	7/2000	8/2000	Improved bank and streambed stability.	Installation and operation of project facilities.	20.00%
3	7/2000	8/2000	Eliminated passage barriers and reduced migratory impediments.	Install and operation of project facilities.	20.00%
4	5/2000	12/2000	Reduced stream and return flow temperatures.	Installation and operation of project facilities.	20.00%
5	10/2000	12/2000	Improved riparian condition and extent	Reestablishment of stream bank vegetation; reconstructed corridor fences.	10.00%
6	1/2000	12/2000	N/A	Collected and evaluated project information	0.00%
				<b>Total</b>	100.00%

#### **Schedule constraints**

The Oregon Department of Fish and Wildlife requires instream construction work to be completed between July 15 and August 15 or 31 for John Day streams, depending on location. Permitting and compliance can require 3-4 months for completion.

#### **Completion date**

2001

## **Section 5. Budget**

**FY99 project budget (BPA obligated):** \$215,756

### ***FY2000 budget by line item***

<b>Item</b>	<b>Note</b>	<b>% of total</b>	<b>FY2000</b>
Personnel	All personnel costs are covered in other contracts.	%0	0
Fringe benefits	None	%0	0
Supplies, materials, non-expendable property		%15	66,900
Operations & maintenance	All operations and maintenance is the responsibility of the landowner under signed agreements.	%0	0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Capital equipment would include items such as pumps, wheelines, handlines, etc.	%5	20,900
NEPA costs	Planning and compliance is covered in	%0	0

	other contracts.		
Construction-related support	All construction is implemented and administered by the GSWCD; 10% contingency.	%9	42,000
PIT tags	# of tags:	%0	0
Travel		%0	0
Indirect costs		%0	0
Subcontractor	The GSWCD is the sole contractor.	%65	300,118
Other		%7	30,000
<b>TOTAL BPA FY2000 BUDGET REQUEST</b>			<b>\$459,918</b>

### ***Cost sharing***

<b>Organization</b>	<b>Item or service provided</b>	<b>% total project cost (incl. BPA)</b>	<b>Amount (\$)</b>
BPA	Equipment, equipment rental, supplies, subcontractor, and other	%44	459,918
Local Agencies	Planning, design, compliance, review, and other cost-share	%7	74,000
Landowners	Labor, equipment, operations, and maintenance	%4	41,000
		%0	
<b>Total project cost (including BPA portion)</b>			<b>\$1,034,836</b>

### ***Outyear costs***

	<b>FY2001</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
<b>Total budget</b>				

## **Section 6. References**

<b>Watershed?</b>	<b>Reference</b>
<input type="checkbox"/>	Anonymous. 1991. Integrated system plan for salmon and steelhead production in the Columbia River basin. Prepared by the agencies and Indian Tribes of the Columbia Basin Fish and Wildlife Authority. CBFWA and Northwest Power Planning Council.
<input type="checkbox"/>	Anonymous. 1996. Wy-Kan-Ush-Mi Wa-Kish-Wit. The Columbia River anadromous fish plan of the Nez Perce, Umatilla, Warm Springs and Yakama Tribes. Vol. I and II.
<input type="checkbox"/>	Beschta R.L., W.S. Platts, and B. Kaufmann. 1991. Field review of fish habitat improvement projects in the Grande Ronde and John Day River basins of eastern Oregon. Oct. 1991. pp 52.
<input type="checkbox"/>	Boyd M. and D. Sturdevant. 1997. The scientific basis for Oregon's stream temperature standard: common questions and straight answers. Oregon Dept. of Env. Quality. pp 28.
<input type="checkbox"/>	Linday R.B., W.J. Knox, M.W. Flesher, B.J. Smith, E.A. Olsen, and L.S. Lutz. 1985. Study of wild spring chinook salmon in the John Day River system. U.S. Dept. of Energy, Bonneville Power Administration, Division of Fish and Wildlife. DOE/BP-39796-1.
<input type="checkbox"/>	Robertson S.W. and K. Delano. 1998. Holliday Ranch return flow cooling project, 1995-1998 monitoring report. Confederated Tribes of Warm Springs, John Day Basin Office. In Prep.
<input type="checkbox"/>	Robertson S.W. 1997. 1998 Interim consensus water quality monitoring plan. Confederated Tribes of Warm Springs, John Day Basin Office. John Day, OR.
<input type="checkbox"/>	Robertson S.W. 1998. 1999 Interim consensus water quality monitoring plan. Confederated Tribes of Warm Springs, John Day Basin Office. John Day, OR. In Prep.
<input type="checkbox"/>	Torgersen, C.E. 1996. Multiscale assessment of thermal patterns and the distribution of

	chinook salmon in the John Day River basin, Oregon. M.S. Thesis. Oregon State Univ. pp 99.
<input type="checkbox"/>	Bureau of Reclamation. 1994. Water conservation demonstration project, John Day basin, Oregon. Pacific Northwest Region. Boise, ID. pp. 20.
<input type="checkbox"/>	U.S. Fish and Wildlife Service. 1996. John Day River water conservation demonstration project, phase III, planning aid memorandum. Oregon State Office.
<input type="checkbox"/>	U.S. Fish and Wildlife Service. 1995. John Day River water conservation demonstration project, phase II, planning aid memorandum. Oregon State Office.
<input type="checkbox"/>	U.S. Fish and Wildlife Service. 1998. John Day River water conservation demonstration project, phase IV, planning aid memorandum. Oregon State Office.
<input type="checkbox"/>	U.S. Bureau of Reclamation. 1996. John Day basin water optimization projects, phase III. Pacific Northwest Region...
<input checked="" type="checkbox"/>	U.S. Bureau of Reclamation. 1992. Stream restoration program for the upper mainstem of the John Day river. Pacific Northwest Region. Boise, ID.
<input checked="" type="checkbox"/>	U.S. Bureau of Reclamation. 1990. Upper John Day River basin master water plan working paper. Pacific Northwest Region. Boise, ID.
<input type="checkbox"/>	Unterwegner T. and M. Gray. 1998. U.S. v Oregon John Day River status report: spring chinook. Oregon Dept. of Fish and Wild. John Day District Office.
<input checked="" type="checkbox"/>	Oregon Water Resources Department. 1986. John Day River basin report. State of Oregon. pp 263.
<input checked="" type="checkbox"/>	Oregon Water Resources Department. 1991. Stream restoration program for the Middle Fork subbasin of the John Day River. State of Oregon. pp 30.
<input type="checkbox"/>	Unterwegner T. and M. Gray. 1998. U.S. v Oregon John Day River status report: summer steelhead. Oregon Dept. of Fish and Wild. John Day District Office.
<input type="checkbox"/>	

## PART II - NARRATIVE

### Section 7. Abstract

The proposed projects are intended to increase in-season river flows through a combination of irrigation efficiency measures; reduce bank instability, sedimentation, bedload movement, and summer water temperatures thereby improving water quality; reduce or eliminate migratory delays from passage impediments; improve riparian condition; and implement an annual monitoring program evaluating each of the projects. BPA's proportion of the cost share for this program in the past has been less than 50%. Since this project proposal is being submitted two years prior to implementation, only 27% of the projected costs could be secured from other sources at this early date. However, we anticipate securing additional cost share funds as we approach FY2000, and are currently negotiating with the BOR to procure funds that would again reduce BPA's cost share proportion below 50%. In addition, this project does not require complete funding to be effective. If the funding amount is less than proposed, individual projects can be reprioritized and reprogrammed for future years, or potentially funded from other sources.

These projects respond directly to, and are consistent with, tribal, state, and federal goals and objectives within the region's plans and programs. Previous projects of these types have demonstrated success in addressing limiting factors identified for salmonid production in the basin. They follow comprehensive assessments of the watershed and detailed stream restoration plan. The benefits are to entirely wild stocks and associated habitats.

Each project utilizes standard design criteria, and were selected using an interagency evaluation and prioritization process. The effects of varying project implementation scenarios on river flows and stream temperatures have been analyzed through studies of the basin hydrology. Hydrologic and temperature models were prepared for the mainstem to assist in the evaluation. The effects

of individual projects were also assessed for impacts on stream flow, temperature, sediment, and other resources.

These projects will be incorporated into an annual monitoring plan that follows standard methods for the examination of water and water quality. Channel and riparian surveys will follow standard methods of assessment. In addition to the site-specific restoration objectives, the long term restoration needs of the basin will be evaluated with respect to project achievement of biological goals.

## Section 8. Project description

### a. Technical and/or scientific background

**PROBLEM BACKGROUND:** Salmonid issues in the John Day basin are varied and complex, as in other river systems. However, much of the current limitation on anadromous and resident cold-water production is related to habitat condition. Habitat issues have been extensively studied over the last thirty years and are detailed in numerous reports, watershed assessments, management plans, and other similar documents. The Tribes, Oregon Department of Fish and Wildlife (ODFW), Oregon Water Resources Department (OWRD), Northwest Power Planning Council (NPPC), Bonneville Power Administration (BPA), Bureau of Reclamation (BOR), Oregon State University (OSU), and many others have conducted assessments and research, prepared management plans, or implemented restoration activities in response to identified or suspected issues. The Tribes, in Volume II of the *Spirit of the Salmon* plan (Anonymous 1996), summarize the following problems in the basin:

*Riparian habitat degradation is the most serious habitat problem in the John Day River Basin with approximately 660 degraded stream miles identified. Degraded fish habitat in the [basin] is a result of low winter water temperature, high spring flows, depressed beaver populations, accelerated streambank erosion, excessive stream sedimentation and reduced instream cover. The basin's ability to naturally repair itself from riparian habitat degradation and other impacts is slow in the John Day's semiarid environment and some areas are adversely affected by activities which ceased long ago. In other cases, poor management practices continue and problems are escalating. As soil erosion increases, flooding occurs and streambanks erode away, degrading habitat quality. In many tributary streams, excessive water volumes are deepening channels, thus lowering water tables in the immediate proximity [internal citation omitted]. Such loss of habitat quantity and quality, managers believe improved irrigation systems along with restoration of the uplands and riparian systems would provide the greatest long-term natural benefits for fish and improve late season stream flow as well.*

Other research and assessments, such as the ODFW spring chinook study (Lindsay et. al. 1985) and the OSU multi-year research project, identify similar problems. The Integrated System Plan (Anonymous 1991) summarizes spring chinook salmon production issues as follows:

*Limiting factors on the John Day include a number of habitat oriented problems. Passage and spawning is limited during low water years due to natural flow condition, but further aggravated by water withdrawals. This invokes high temperatures in certain areas that further restrict spawning.*

In response to identified issues and recommended restoration actions, the basin's principal management agencies have developed and implemented both active and passive restoration programs. Their efforts have focused primarily on improvements in instream and riparian habitat, water quality and quantity, and channel stabilization. Each individual management or



project plan is generally integrated into comprehensive, programmatic management documents. Project efforts rely and build adaptatively upon previous and ongoing activities. The restoration program appears to have resulted in some significant successes, in particular with spawning and rearing of spring chinook on private lands.

The John Day Basin Watershed Restoration program is a result of a long-term study and planning process to develop a comprehensive suite of projects that addresses not only identified issues associated with production, but also gaps in ongoing agency restoration efforts. A thorough description of the planning process, project history, and accomplishments is detailed in the Project History section below.

**PRODUCTION BACKGROUND:** Over the last 20 years, spring chinook production has been on an upward trend overall in the John Day, with 70% of the last ten year's spawner-recruit ratios above replacement. Habitat as a whole is improving, particularly in the upper mainstem and Middle Fork, where restoration activities have been intense. The combination of corridor fencing and improved irrigation management has resulted in significant shade increases, stabilized banks, decreased water temperatures and extended juvenile rearing (Unterwegner and Gray 1998).

Although steelhead basinwide are on a downward trend, there are a number of positive aspects to this trend, with respect to a restoration program. The North Fork and upper mainstem populations are currently the most robust (as noted above, the upper mainstem has been a focus of previous habitat restoration activities). Passage improvement projects on several tributaries have increased potential spawning and rearing habitat by almost 151 miles. Recent declines in abundance have been attributed to poor ocean conditions and a decrease in smolt to adult survival (Chilcote 1998). Due to their spawning and rearing primarily in smaller basin tributaries, steelhead are more heavily influenced by changes in habitat (Unterwegner and Gray 1998). The current John Day steelhead population, even though lower than historic production, is self-sustaining and capable of responding to more favorable environmental conditions. Improvements in tributary habitat, flow, and passage (as this project proposes), is anticipated to positively effect steelhead production.

**RESPONSE TO IDENTIFIED PROBLEMS:** The comprehensive watershed assessment for the John Day identified a primary need to increase late season flows, which are often below 25 cfs, in primary spawning and rearing habitat (approximately 13 cfs less than what is needed) (BOR 1994). Accompanying this objective, was a need to lower summer water temperatures within the same general locations. Although water temperatures are greatly affected by the nature and extent of riparian vegetation, stream flow magnitude is potentially the most significant stream parameter leading to stream temperature change (Boyd and Sturdevant 1997). In addition, the 1978—1985 spring chinook study (Lindsay et. al. 1985) identified habitat limitations in the mainstem as a cause of depressed production and specifically noted areas of suitable habitat that were currently unoccupied due to affects from water withdrawals.

The ODFW, GSWCD, and NRCS have taken the lead on private lands to restore and protect riparian and instream habitat. However, their programs did not focus on improving flow conditions directly. To address this deficiency, the interagency team proposed to identify projects which encompassed critical spawning and rearing areas (and some migration corridors to these areas) which would enhance late season flow conditions and water temperatures. Projects were also selected which would either have multiple benefits to resident fish, riparian, or other important resources or could be designed to capture these benefits. In addition, we were interested in promoting projects that were within areas previously enhanced by other agency programs, such as riparian corridor fencing or instream habitat restoration (a more thorough discussion of the relationship between this restoration program and other agency efforts is discussed below in Relationships to other projects).

Conceptual projects were evaluated and modeled by the interagency team working on the water optimization study. Evaluations of completed demonstration projects provided additional information regarding resource response and results (discussion of past achievements is included in the section Project history, below). In addition, the USDI Fish and Wildlife Service has evaluated the construction projects from 1993 through 1998, which were permanent diversions, pumping stations, return flow cooling projects, irrigation stream crossings, and infiltration galleries similar to the proposed projects. They conclude that reducing diversion requirements and reducing warm water return flows, will increase juvenile rearing adult holding survival (U.S. Fish and Wildlife Service 1996) and provide "significant benefits to spring chinook salmon, summer steelhead, and resident species" (U.S. Fish and Wildlife Service 1995). Further, they conclude that without the projects, adverse impacts on fish and wildlife resources, destruction of riparian vegetation, destabilized streambanks, removal of invertebrates and other aquatic lifeforms, increased turbidity, siltation, and migratory barriers will continue (U.S. Fish and Wildlife Service 1998). Their conclusions were essentially the same as those that the agencies and Tribes reached during the proposal and design phase of the projects and during the water optimization study.

ANTICIPATED BENEFITS: A detailed description of the project objectives is in Proposal objectives and a discussion of the realized benefits of past projects is contained in the Project history section, below. The following discussion describes the general benefits associated with the overall restoration program ongoing in the basin.

The restoration effort in the upper basin has been ongoing for over ten years. Each newly proposed project is viewed as a integral part of the overall watershed effort, contributing to the greater, positive cumulative benefit of increased late-summer flow, reduced sedimentation, lowered water temperature, and improved riparian condition, within areas of importance for salmonid production. Through experience with past projects, we have shown that reduced diversion amounts, and therefore improved flow conditions, remain instream at least down to the next diversion, which in many cases is two to three miles, or more, downstream of the project. Improved temperature conditions are highly dependent on a number of other factors and vary between projects. However, the combination of both beneficial effects can result in significant benefits when the project area encompasses critical spawning, rearing and migratory areas, as these do. Since the projects are integrated across the watershed, work generally progresses from location to location which most greatly benefits a large habitat feature (e.g. spawning ground) or stream reach. For example, activities may progress from upstream to downstream at each point of diversion within a given project area to effectively maximize water savings along a longer reach of stream.

The greatest demonstration of the use of effective scientific principles in designing each project and in effective dynamic management, is in the biological response following project implementation, evaluation of that response, and modification of future projects to enhance positive benefits. The results of monitoring on previous projects has characterized a reduction in diversion rates, lowering of stream temperatures, reduced passage impairment, increased bank stability, and improved riparian condition. Restoration actions may have contributed to the overall improvement in habitat condition and increased returns of spring chinook. These projects are the result of over six years of intensive study by the Bureau of Reclamation, Tribes, Oregon Department of Fish and Wildlife, Natural Resource Conservation Service, Oregon Department of Fish and Wildlife and others. The cumulative effects of long term implementation and operation have been modeled, analyzed, and evaluated by numerous agencies. Project design and monitoring procedures are further evaluated by an interagency team of professionals within the basin and region. The projects are being proposed as the best, given the current extent of scientific knowledge, methods to achieve accomplishable objectives with regards to flow

enhancement.

In addition, each project is a permanent installation of a project structure. The landowner accepts all responsibility for operations and maintenance. Since these projects are usually the only available means for diversion, conveyance, or application, we assert that they will remain a permanent fixture of the ranch operations. Consequently, the benefits of the project are anticipated to last as long as the structure is in place, which should be as long as a active agricultural operation is viable.

**PROJECT SELECTION BACKGROUND:** Each project is selected from a range of construction alternatives. For example, when considering alternatives to push-up diversions, a wide range of structures are evaluated. These may include major or minor structures such as installation of a permanent diversion, pumping station (electrical or internal combustion), or an infiltration gallery. The cost of constructing each type of installation, the costs of operation and maintenance, and the site conditions are all compared to the anticipated benefit to the resources (e.g., landowner operations, bank stability, instream flows, etc.) Although infiltration galleries have been constructed in the past, they do not work at all sites (i.e., availability of on-site electrical power since not all can be used without a pump installation), nor do all landowners desire to accept the higher costs of electrical pumping in perpetuity. Numerous pumping stations have also been installed in the past, and for similar reasons, they cannot be used at every site. In addition, the use of combustion engine pumps poses other inherent hazards such as elevated fuel costs and noise/air pollution. As the prior constructed demonstration infiltration galleries and pumping stations receive additional attention and scrutiny, any remaining landowner and resource related issues should be able to be addressed.

**PRE-PROJECT FACILITY CONDITION:** Currently, irrigation systems and operations vary across the basin. Generally, irrigation is initiated around 1 April and concludes on 30 October, coinciding with legal appropriation dates. Some diversion for stock watering occurs outside of this period. Diversion will generally be lower in the spring, when temperatures are cooler, and intensify until haying season, which begins about the first of June and progresses upriver until it is concluded approximately the middle of July above Prairie City. Following completion of haying activities, diversions are reopened for regrowth and a second cutting of hay in most places. However, rates of diversion are highly dependent upon temperature, spring moisture, and river levels. Wild flood irrigation is by far the single most common irrigation method and surface water is the most heavily used water source (Anonymous 1986).

The most common method of diversion is to construct a push-up dam, using heavy equipment, within the stream at or near the legal point of diversion. The dam is usually constructed of locally available materials, such as cobble, gravel, and boulders, that are scavenged from the site, either within the stream channel or off the stream banks. Frequently, other materials such as PVC plastic sheeting, concrete, car bodies, timbers, plywood or other such objects are used to provide structural integrity and seal the diversion dam. As flows decrease through the summer season, usually additional excavation and placement of material on the dam face (especially plastic sheeting) are necessary to provide for diversion of rate and duty. These materials are usually left in-place through the summer, and wash out during spring flows the following year.

The effects of continual construction and reconstruction of the push-up diversions, in addition to the trash left in the river and the immediate fish passage barrier, is gradual destabilization of the channel and banks, and sediment delivery to the stream. As materials are continually pushed-up below the dam, and scoured the following spring, a gradual lowering (through headcutting) of the stream bed occurs. This causes the irrigator to constantly move the diversion point upstream due to the loss of hydraulic head. This has resulted in diversion points being moved oftentimes hundreds of feet upstream, causing destabilization all along the length of stream being traveled.

Water is typically diverted from the dam, through a headgate and fish screen (though not always), through an open conveyance system (usually a ditch or canal) and applied to the field through open laterals. Many ditches were constructed over 70 years ago, with no regard to efficiency. The effect has been significant conveyance losses and thermal loading due to long travel times and poorly constructed systems. The cumulative effects has been a reduction in instream flow and lack of capturing water conservation savings.

**PROJECT FEATURES GENERALLY:** Unfortunately, there are no non-structural approaches currently available for diverting water from a river, for which the irrigators have a legal right to do. After long periods of study and evaluation, the proposed projects have been chosen as the best alternatives to the current conditions. The general features of each type of project is discussed below. Less intensive structures (pumping and infiltration galleries) are considered wherever feasible.

Infiltration galleries are well screens that are buried below the surface of the streambed, perpendicular or otherwise, and bedded in gravel. They collect subsurface flow and carry it to a gated valve located at least as far back as the streambank. At this point, flow may be pumped or gravity fed to a conveyance system of pipe or open ditch, depending upon configuration, and then out to the field where it is either applied through gated valves or open laterals. A bypass valve and pipe returns flow to the river that exceed the legal rate and duty. Although infiltration galleries have the least long-term effect on fish passage and bank stability, they can be most expensive to install, maintain and operate.

Permanent diversions are similar in theory to the push-up gravel dam but are constructed from concrete and steel, provide fish passage at all water levels, are significantly more effective and efficient, and eliminate the annual construction needs associated with a gravel dam. They are constructed with two separate openings on opposite sides of the river. The spillway is located on the side closest to the headgate, while the fishway is on the far side of the river. As flashboards are installed in the spillway, the water level rises concurrently in the fishway (flashboards are not installed in the fishway), providing additional water for fish passage. Consequently, flashboards appear to be the most effective method of ensuring adequate flows through the headgate (then through the fish screen and out to the ditch) without any impairment of fish migration. Evaluation of previous projects has shown that when the sill of the spillway is set equal to the elevation of the headgate, flashboards are not even needed until late July or early August in a normal water year, and in some instances, are not even installed. This effectively replaces diversions that were, oftentimes, a complete barrier to streamflow, and therefore upstream migration, season long.

Permanent diversions are installed at a maximum depth of three feet below riverbed grade. Based upon monitoring and evaluation conducted in the upper mainstem, it appears that groundwater interacts with the river in two ways: 1) through lateral releases from water present in adjacent banks/floodplains; and 2) through parallel intergravel flow subsurface to the riverbed. Since the permanent diversion is installed perpendicular to the channel, there is no way for the "hard" parts of the structure to intercept any potential lateral exchange of flow, in either a "gaining" or "losing" reach of stream. Intergravel interception typically occurs where a break is present in the river bed (e.g., riffle breaks into a pool) and a small plume of cooler water upwells. Since push-up diversions are constructed by excavating a berm using riverbed and bank materials, subsurface flows may be intercepted if the downstream area is excavated. However, the relatively minor benefits of a small pocket of cool water does not appear to outweigh the detriments of delayed or impeded fish migration. The minimal installation depth of the permanent diversion and the nature of intergravel flows precludes any significant interception of subsurface flows.

Pumping stations usually eliminate the need for any type of instream diversion dam. A pump is installed to take advantage of a local stream feature, such as a pool, where additional instream construction is unnecessary. However, as with infiltration galleries, operations of a pumping station is often cost prohibitive.

Irrigation efficiencies take many forms but usually feature improvements or reconfiguration of an existing irrigation system, such as converting from open ditches to pumps or from flood to sprinkler irrigation. They may occur in combination with improvement in the diversion structure, but may rely upon traditional methods of diversion where a significant resource issue is not present.

Crossing installations usually occur where an open ditch contributes flow to a stream, then diverts the mixed water, usually downstream, into another ditch on the side opposite where it originally entered. This can contribute to significant stream warming, as the water that empties into the stream has travelled a long distance through a open ditch. Water that is then diverted has been mixed with cooler stream water, where it again travels through an open ditch prior to being applied to the fields. Crossings, use an inverted siphon to carry ditch water underneath the stream bed and on to the remainder of the ditch without mixing with the stream water.

Return flow cooling projects are generally associated with replacing old conveyance systems with upgraded PVC pipe. Historically, tailwater was collected, after being used on the fields, in open ditches or wooden pipes and carried back to the river. Long travel times, and exposure to sunlight and ambient air contributes to significant warming of the water prior to reentering the river. In addition, many of the wooden drains, which were installed over 70 years ago, have collapsed in places which creates ponding on the surface of the fields, again leading to warming of the return flows. The return flow projects either replace the failing wooden pipes or convert the open system to a below ground return system. The effect is to eliminate thermal loading, expose the water to the cooling effect of the earth, and cool return flows usually below river temperatures.

**CRITICAL UNCERTAINTIES:** The primary critical uncertainty in project implementation is the reasonable reassurance of funding availability. Preliminary planning and design has already been completed for each project and landowner concurrence has been given, although the final agreement documents cannot be approved until funding has been appropriated. Since the ODWR and ODFW are program cooperators, instream permits have been reviewed and approved in the past in a timely manner. Generally, NEPA and ESA compliance have progressed in a timely manner, when the appropriation has been secured early in the process. Since we are proposing FY2000 projects in this document, the team believes that there is more than sufficient time to complete all compliance and review in a timely manner.

**b. Rationale and significance to Regional Programs**

The John Day Watershed Restoration program, and incorporated projects, responds to many of the goals and objectives within the region's plans and programs. Although all of these goals cannot be responded to in this form, key passages are listed below. Other objectives met, to varying degrees, with these projects include the Program's doubling goal (4.1), principles of salmon and steelhead rebuilding (4.1A), wild and naturally spawning population policy (7.1D), habitat goals and policies (7.6), coordinated habitat planning (7.6C), habitat objectives (7.6D), cooperative habitat protection and improvement with private landowners (7.7, 10.2B), implementation of state, federal and tribal habitat improvements (7.8), water conservation (7.8H), passage and protective screens on tributaries (7.10), resident fish goals (10.1), and diversion screening and passage (10.2C).

As discussed in previous sections, each proposed project is described in the comprehensive watershed assessment and stream restoration plan(s). These plans were prepared, in part, in order to provide programmatic consistency with the region's plans and programs which were fully considered during the development of the John Day basin plans. In fact, much of the general guidance for the John Day basin plans was extracted from the regional plans, which preceded our basin efforts. As individual projects are proposed, they are prioritized using an interdisciplinary team of specialists from numerous agencies according to, in part, the extent that each project would meet their goals and objectives.

Specifically, the *Spirit of the Salmon* plan recommended habitat enhancement actions for the John Day subbasin regarding instream flow and passage. The implementation section of the plan recommends activities to "[i]mplement more efficient irrigation methods and water conservation practices benefiting landowners and instream flows."

The NPPC's Columbia Basin Fish and Wildlife Program (CBFWP) in chapter 5.4D.8 directs the BOR to "[e]valuate the potential for water conservation, water efficiency or other measures in [BOR] programs with the most potential to benefit anadromous fish and with the least impact on third parties." The BOR sponsored and assisted in the preparation of the water optimization and stream restoration plans. The BOR also funded the initial demonstration projects, and currently cost-shares a portion of the construction and planning for current projects and funds all of the monitoring and project evaluations. Monitoring of the initial demonstration projects has identified the positive benefits of these actions. The proposed projects are the logical extension of completing successful demonstration projects and broaden the nature and scope of the developed technology.

The CBFWP also requires that "...[i]n identifying actions, use Table 1, Table 2, and Appendix A of the Columbia Basin Tribal Restoration Plan submitted to the Council on August 15, 1994, the Integrated System plan and other appropriate information... (7.0A.1)". As described above, these projects are incorporated and described in the Tribal restoration plan. In addition, the Tribes were a cooperator on the water optimization and stream restoration plans (where these projects are also captured) which were prepared, in part, as a response to issues identified in the subbasin plan and subsequent Integrated System Plan.

The Integrated System Plan (Anonymous 1991) identifies the following goals & policies:

- i) Area above Bonneville Dam is accorded priority:  
Response: The John Day basin is above Bonneville Dam.
- ii) Genetic risks must be assessed:  
Response: The John Day supports one of the largest remaining, completely wild/natural populations of anadromous fish in the Columbia River basin. The projects are intended to increase productivity of wild stocks.
- iii) Harvest management must support rebuilding:  
Response: No sport fishing for spring chinook salmon has been permitted in the basin since 1978 (Anonymous 1991) and subsistence fishing has been estimated at between approximately 2% and 20% and do not appear to impact John Day River stocks (Lindsay et al 1985) Although sport fishing for summer steelhead is currently allowed, a "no-kill" regulation is in effect. Catch and release mortality on summer steelhead is assumed to be negligible.
- iv) System integration will be necessary to assure consistency:

Response: All projects have been integrated in the watershed assessments and stream restoration plans. Modeling has identified the most complementary combination of projects with the greatest benefit to stream flow and temperatures. Additional collaboration with other agencies and publics occurs during planning and in the field during project construction. Monitoring has been coordinated through county committees, formally through agreements among the agencies, and informally through regular agency contact.

v) Adaptive management should guide action and improve knowledge:

Response: Proposed actions build upon previous project activities and monitoring information gathered from these projects. These projects are a result of identified gaps in previous agency programs and respond to critiques of past restoration actions (Beschta 1991).

The Integrated System Plan further identifies the following recommended actions specific to the John Day: "Enhance streamflows through improvement of irrigation efficiency, water conservation, enforcement of established minimum streamflows, instream water rights, and watershed improvement, riparian storage, and beaver management."

The CBFWP in section 2.2A recommends that programs should "Support Native Species in Native Habitat: The Program preference is to support and rebuild native species in native habitats, especially weak stocks." John Day spring chinook are classified as wild stock that is depressed but stable, with enhancement through a natural production strategy. All John Day summer steelhead are wild and classified as healthy and increasing (although current trend is downward which has led to a recent reclassification), with increased natural production recommended as a restoration strategy.

In section 2.2C.1 (Share Costs) the [NPPC] "expects that costs will be shared among parties to implement measures in the Program, in particular, for projects that mitigate the effects of non-hydropower caused problems." Although BPA's cost-share contribution for these projects is 73%, the Tribes and GSWCD have been able to reduce their contribution in the past to less than 50%, sometimes less than 25%. We assert that the higher proportion of BPA's commitment for FY2000 is due to the request being prepared two years prior to implementation, which is earlier than our requests to other agencies. We believe that we will be successful in securing additional funds, whereby BPA's contribution could be reduced.

Section 7.6B, Habitat Policies, the NPPC proposed to "[g]ive highest priority to habitat protection and improvement in areas of the Columbia Basin where low or medium habitat productivity or low pre-spawning survival for identified weak populations are limiting factors. Give priority to habitat projects that have been integrated into broader watershed improvement efforts and that promote cooperative agreements with private landowners" (7.6B.3). Further, the NPPC recommends that agencies "[e]ncourage the involvement of volunteers and educational institutions in cooperative habitat enhancement projects. Promote public outreach and encourage education in watershed and resource management and protection throughout the basin" (7.6B.6). As discussed earlier, habitat productivity has been identified as a potential cause of depressed salmon production in the John Day. These projects have clearly been incorporated into broader watershed assessments and restoration efforts, and rely exclusively on cooperations with private landowners. A strong public relations effort has been implemented by the Tribes and GSWCD resulting in overwhelming interest and support for the program.

The NPPC's Salmon and Steelhead Rebuilding Principles are described in section 4.1A. The John Day Watershed Restoration Program specifically responds to the Council's recommendation that (3) "...[s]pecial priority should be given to projects that are part of model watersheds or other coordinated watershed programs, especially those with local community involvement" and (5)

‘[c]onsistent with the Council’s adaptive management policy, priority should be given to activities that address critical uncertainties and/or test important hypotheses...” These projects are the result of modeling and evaluations of various restoration strategies that were hypothesized to benefit flows, temperatures and production. Gaps in agency programs created unknown expectations for project results. Evaluation of the demonstration projects tested these hypotheses and further evaluation are used to adapt emerging technology.

**c. Relationships to other projects**

A critical component of the John Day watershed assessment and restoration plans was to identify gaps in the ongoing agency programs. Although the plans recommended some modifications to existing programs, they primarily focused on developing additional programs and projects that would address the deficiencies identified. Consequently, the proposed projects complement the ongoing activities of other agency efforts.

A directly complementary program is project 8402100, Protect and Enhance John Day River Fish Habitat, implemented by the ODFW. The ODFW effort focused in the past on instream habitat restoration and most recently on riparian recovery through riparian corridor fencing. Our proposed projects are complementary in that many are located within past ODFW project areas, and consequently the instream and riparian habitat restoration components have already been completed. Completion of the water quality related projects, therefore, may have a significant cumulative beneficial effect.

The North Fork Watershed Council project, Eliminate gravel push-up dams on lower North Fork John Day (#9045), is directly related in that it utilizes technology developed by the GSWCD and is coordinated through the Monument SWCD and NFWC, of which the Tribes are a participant. Improvements in project design or operations are shared between the SWCDs.

The Oregon Fish Screening Project (#9306600) is generally affected through implementation of the John Day Watershed Restoration program. Irrigation screening began in the late 1950s and continues under the BPA fish screening and passage improvement program. The proposed projects reduce the need for fish screens by providing alternative measures (*see* 10.2C of the Program), in some cases, by converting flood diversion to pumping stations. In other situations, the effectiveness of the screening device is enhanced through reconfiguration of the diversion structure. Project construction schedules are coordinated between the ODFW and Tribes/GSWCD in order to avoid any potential conflicts and to maximize cost effectiveness.

Other agencies have ongoing programs within the basin, and the agencies have non-BPA funded projects/programs, that integrate with this restoration program. The Natural Resources Conservation Service and the Oregon Department of Agriculture are currently working on individual ranch management plans and Water Quality Improvement Plans within the John Day. Both processes propose active and passive restoration actions that include and complement our proposed projects. Passive restoration actions proposed under the ranch management plans are crucial to the success of the proposed restoration actions in order to provide for long-term achievement of recovery. The Tribes are a advisory member of the WQIP process.

Part of the John Day Basin Office’s efforts is to work cooperatively with landowners, the Oregon Water Trust, and others to identify opportunities to secure instream flows using water “freed up” through the implementation of conservation projects. Under current Oregon water law, there are a number of opportunities to accomplish this objective. However, our *experience* has been that landowners are very reluctant to discuss this issue concurrently with discussing the construction portion of the project. Rather, our greatest successes have been realized by approaching the landowner or irrigation district after the conservation project has been implemented and actual



“surplus” water amounts can be presented for consideration of instream lease. However, we do have two ongoing negotiations where landowners are willing to discuss transferring part of their consumptive use to an instream flow as their cost-share contribution of the project. As with construction alternatives, this aspect will always be considered where appropriate.

The CTWS currently have a signed agreement with the GSWCD and ODFW for coordination of restoration projects and an agreement with OSU for monitoring. These agreements are anticipated to be updated for FY2000. In addition, issues and opportunities in the basin are coordinated through a multi-agency team of professionals. Although this team is not formally coordinated through an interagency agreement, the completed restoration projects demonstrate the success of ongoing project collaboration.

As explained in Schedule Constraints and Critical Uncertainties, above, these projects require permitting by other agencies, specifically the Oregon Division of State Lands (Clean Water Act 404 discharge permit) and U.S. Fish and Wildlife Service (Endangered Species Act and Fish and Wildlife Coordination Act compliance). A responsibility also exists to the BOR and BPA for National Environmental Policy Act compliance. Since planning has already been initiated, early funding will allow submission of permit applications in sufficient time to perform instream construction activities during the 2000 instream construction “window”.

**d. Project history (for ongoing projects)**

In 1988 the John Day Basin Council enlisted the help of the BOR to provide technical assistance in preparing a watershed improvement plan. The goal was to create a list, using scientifically credible assessment methods, of “do-able” projects, with positive effects on water quality and quantity and aquatic habitat. In 1990, the planning efforts of the Tribes, agencies, and public culminated in the Upper John Day River Basin Master Water Plan Working Paper (BOR 1990). The Working Paper identified critical gaps and areas for improvement in ongoing agency programs and outlined projects that addressed these deficiencies. In subsequent years, individual stream restoration plans were prepared for the major watersheds in the upper and middle subbasin. These documents detail a comprehensive restoration program involving multiple agencies that targets all components of the watershed. The implementation strategy involves numerous measures, which used in combination, will result in beneficial effects to the watershed.

Implementation activities, under the master watershed plan, began in 1995 with the Luce-Long, Cathedral Rock, Holliday Return Flow Cooling, and Crown Ranch Return Flow projects. These projects were implemented to demonstrate positive achievements in riparian, instream habitat, and water conservation. Each was planned and constructed with the involvement of multiple parties in a cost-sharing arrangement. Preliminary results on the demonstration projects were extremely positive. The Luce-Long project eliminated a “push-up” diversion, previously identified as a migration impediment, replacing it with a permanent, concrete and sheet steel device. The project benefits instream habitat through the elimination of a potential fish passage barrier (passage is assured at all river levels), ensures appropriation of water to rate and duty, and reduces sedimentation and bank erosion. The Cathedral Rock project actually abandoned a fish passage impediment and increased irrigation efficiency through conversion of an open ditch to a closed-pipe conveyance. The Holliday and Crown Ranch Return Flow projects converted surface irrigation drains to below-ground return systems.

Monitoring on the Holliday project has shown a remarkable decrease in return flow temperatures to the river. Prior to implementing the project, only 27.5% of return flows were less than 64 degrees (the State water quality standard), while over 83% of post-project return flows were below the standard (Robertson and Delano 1998).

In 1996, the CTWS and GSWCD signed an agreement to implement additional projects under the "Early Action Watershed Projects" program of the BPA. In 1996, the Holliday Diversion, Kight and Ediger Irrigation, and Lemon's Infiltration Gallery projects were completed. The Holliday Diversion project converted a push-up diversion to a permanent structure, eliminating a fish passage impediment. The Kight and Ediger Irrigation projects involved reorganization of the flood irrigation system to an efficient sprinkler operation. These projects reduce diverted amounts and result in additional flows remaining in the river for a longer period of time (from moving the point of diversion downstream). The Lemon's project consisted of replacing a permanent diversion with an infiltration gallery and converting a portion of the open ditch system with a below-ground conveyance operation. This results in much less water being diverted (from a reduced need to divert more water to achieve sufficient hydraulic head and to replace conveyance losses) and entirely eliminated a fish passage impediment. All projects consisted of cost-sharing with multiple parties, which effectively reduced BPA's contribution on the projects to less than 50 percent.

In 1997, the CTWS and GSWCD implemented additional projects under an updated agreement. The Field's Irrigation and Infiltration Gallery, and Page and Clausen Irrigation Conversions were implemented in the 1997 field season. Although analysis of monitoring information has not yet been completed, early predictions of project results appears promising. The Fields project eliminated a fish passage barrier in an area of primary chinook spawning, reduced irrigation needs (by reusing warm tailwaters for irrigation), and improved irrigation and conveyance efficiencies. By reusing warm tailwater for irrigation, forage production is increased and river diversion needs are reduced. The Page and Clausen projects reduce irrigation needs by improving irrigation efficiency. The anticipated results of these projects is that additional, higher quality water will be left in the river for a longer period of time, stream temperatures will be reduced, and more water overall will remain in the river. The combined effect is to increase streamflow, identified as a critical need in the John Day. BPA's total cost-share obligation for these projects was less than 25 percent. Also in 1997, the Tribes began working with their cooperators to implement other remaining scheduled projects from the watershed restoration plan. Among the planned projects, the beaver management program, Monument Native Plant Nursery project, water quality monitoring, and stream gauge operations were developed and are anticipated to continue through 1998.

The Tribes and GSWCD continued their cooperative involvement in project implementation through 1998. The Holmes and Crown Ranch Diversions, Rudishauser Infiltration Gallery, Lee Irrigation Reorganization, and Morris/Pike Pumping Stations were all completed or nearing completion at the close of 1998. Although only preproject information has been completed to date (post project data will be collected in 1999), results are expected to be similar to previously completed projects of the same nature. Passage barriers were eliminated, irrigation efficiencies were implemented, and water savings should result. Of particular interest, from a water savings perspective, was the Morris/Pike project. Historically water was diverted down an approximately 3 mile long, open ditch, that ran across a south facing slope. Water loss estimates were calculated (using a flow meter) of approximately 25% from the point of diversion to the first point of application (Robertson, unpublished data). Eliminating the ditch by converting to pumping stations should not only result in water savings overall, but also additional water remaining in the river for over five miles (the distance to the next diversion). However, since the next diversion has also been converted to a pumping station (under the 1996 Kight Project), we are anticipating additional streamflow improvements far below the point of diversion for the Morris/Pike project. Evaluating beneficial cumulative effects will be of particular importance in future years and will be specifically identified in the 1999 Interim John Day Basin Water Quality Monitoring Plan (Robertson 1999).

Projects have been selected and funded for 1999. They are essentially similar to those proposed in previous years, but have also been broadened to reflect additional measures from the comprehensive watershed assessments. Implementation on some of the projects has begun, but construction and monitoring will not occur until next year.

**e. Proposal objectives**

Increase in-season stream flows through a combination of irrigation efficiency, riparian recovery, and other irrigation facility upgrades: Irrigation systems were constructed historically without regard to water efficiency. In many cases, water must travel many miles within the ditch before being applied on the field. Conveyance losses due to evaporation, seepage, and spill can be significant. Irrigators may divert more than their legal rate and duty in order to move their full entitlement down the ditch. Push-up diversions, that may be ineffectively designed and constructed, can result in additional misappropriations due to insufficient hydraulic head or seepage and spillage. Permanent diversions and pumping stations allow for a more accurate accounting of diversion rates. The 1978—1985 spring chinook study, and other watershed assessments, identified irrigation withdrawals, which reduce flows and increase temperatures, as a possible limiting factor for spring chinook salmon in the mainstem (Lindsay et al 1985). The interagency watershed assessment and stream restoration plans identify efficiency measures as having the potential for significant, positive effects on flows throughout the irrigation season.

Permanent diversion structures are proposed for the Mascall Irrigation Reorganization, Kilpatrick Pipeline, and the St. Clair Diversions (2) projects. Pumping stations are proposed for the Smokey Creek Irrigation Reorganization (3), Rudishauser Pumping Station, and the Mullin Pumping Station and Irrigation Reorganization projects. These projects are anticipated to contribute to improved stream flow by eliminating the need for over-diversion due to inefficient diversion dams.

Irrigation conversions from flood to sprinkler are proposed for the Smokey Creek and Mullin projects. Upgrading conveyance systems from open surface to below-ground pipe are proposed for the Smokey Creek, Mascall, Kilpatrick, Rudishauser, and Mullin projects. Improved tributary crossing systems are proposed for the Mascall, Kilpatrick, and Rudishauser projects. Flow improvements are anticipated as a result of overall improvements in irrigation efficiencies.

Changes in diversion points are proposed for the Kilpatrick Pipeline and Mullin (2½ miles downstream) projects. Similarly, under the Rudishauser project, late season water rights in a tributary stream will be exchanged for rights in the mainstem. Flow improvements are anticipated from moving diversion points downstream and eliminating late season diversions.

The Ediger and Vindondo Return Flow Cooling projects are anticipated to have a potentially minor benefit to flow by eliminating evapo-transpiration of return flows by converting surface returns to sub-surface.

Improve water quality by reducing bank instability, sedimentation, and bedload movement from annual construction of diversion dams: Annual construction, and reconstruction (on an as-needed basis), of push-up diversions require scavenging of river banks and beds to procure materials for the diversion dam. River banks and beds, up- and downstream of the dam are continually unstable leading to acute and chronic sediment inputs.

Installation of permanent structures on the Mascall, Holmes, Kilpatrick, and St. Clair (2) diversions and pumping stations on the Smokey Creek (3), Rudishauser, and Mullin diversions will eliminate the need for annual construction and in-season reconstruction of push-up diversions.

The Mascall, Rudishauser, and Kilpatrick projects will eliminate entirely three diversion structures on tributary streams by replacing them with permanent ditch crossings.

Reduce or eliminate migratory delays from passage impediments: Anadromous fish entering the upper John Day system have already traveled over 200 miles to access spawning areas. Research that the CTWS -- John Day Basin Office has funded in the upper basin shows that adult holding areas are closely tied to thermal refugia (Torgersen 1996). Most of the refugia areas are in the upper mainstem above Prairie City and the upper Middle Fork, above the Camp Creek confluence. Passage impediments delay migration to spawning areas and may lower spawning success. The proposed projects address passage impediments in the migratory corridor downstream of the identified refugia and spawning areas.

The Smokey Creek (3), Mascall (2), Kilpatrick (2), Rudishauser (2), St. Clair (2), Mullin, and Holmes projects all eliminate passage impediments through installation of permanent diversions, pumping stations, tributary crossings, or combinations of these features.

Improve water quality by reducing water temperatures of return flows and eliminating mixing at stream-ditch crossings: Annual scavenging of materials used in the reconstruction of diversion dams leads to acute and chronic destabilization of stream banks and beds. Sediment transport to streams from actively eroding banks and headcutting stream channels may contribute to impaired water quality. Reduced flows from irrigation diversions are an identified contributor to poor water quality in spawning and rearing areas. In addition, return flow systems that collect and transport tailwaters in open conveyance systems, or below-ground systems that have failed and result in open field ponding, contribute poor quality water to the river.

All projects that reduce sedimentation or improve flows, also enhance water quality to varying degrees. In addition, the Ediger and Vindondo Return Flow Cooling projects may have a direct beneficial effect on water quality, in particular with regards to lowering summer water temperatures.

Improve riparian condition and extent following removal of annual impacts to streambanks: Annual construction of push-up diversions require scavenging of river banks to secure materials for the diversion dam. In addition to removing riparian vegetation, this leads to chronically unstable river banks both up- and downstream of the diversion dam. Increased velocity over the diversion dam scours downstream banks. The diversion projects will eliminate the need for scavenging materials from adjacent river banks and reduce bank scouring below the structure. This, in combination with revegetation following project construction, may result in stable, well vegetated riparian areas surrounding the project structure. Irrigation and agriculture operational efficiencies which improve forage production and quality reduce the pressures to graze riparian and other sensitive areas.

The Smokey Creek, Mascall, Kilpatrick, Rudishauser, St. Clair, Mullin, and Holmes projects all preclude the future need for annual construction of irrigation diversions or instream conveyance structures. On all construction sites, restoration of stream banks and vegetation will occur.

Implement annual monitoring program: The anticipated benefits of project implementation are generally outlined in the comprehensive watershed assessment, stream restoration plans, and other agency documents. The specific benefits are being evaluated under project-level monitoring efforts. In the past, these efforts have been conducted only when monitoring funds have been secured, however, the BOR is now providing funding to annually evaluate each project. A primary objective of the irrigation related projects is to improve late summer flows. Analyzing each project's contribution to this objective requires an assessment of flow conditions downstream of the project.

On an annual basis, the John Day Basin Office prepares and implements a comprehensive monitoring plan that evaluates the specific benefits of the proposed and previous projects. The program will utilize the previous and ongoing efforts, such as the OSU thermal videography project, temperature and flow monitoring, and other activities.

The annual monitoring and evaluation plan is committed as an ongoing agency program and is not funded through the BPA (Robertson 1997, Robertson 1998, and Robertson 1999, in prep). Prior to the monitoring season, an annual monitoring plan is developed and reviewed by the interagency team. Each project is evaluated for attainment of project objectives following construction. A representative sample of each project type is selected for monitoring of specific measurable variables. Monitoring measures include, but are not limited to, installation of photo points, evaluation of channel configuration and recovery, temperature data gathering, stream flow gauging, and stream temperature profile analysis using thermal videography. Through the annual monitoring effort, both site specific project benefits and the overall, cumulative watershed effect can be identified.

#### **f. Methods**

The GSWCD utilizes project design criteria which follow the USDA Natural Resource Conservation Service's standard engineering guidelines as described in their National Cooperative Agreement. Calculations of ground water interception and flow rates are partially based upon "The Design and Construction of Infiltration Galleries" (Bennett 1970), other literature, and past experience with these projects. The technology developed and pioneered in the upper John Day is being adopted by professional scientists and engineers in other parts of the basin and in other basins of the northwest. Instream construction activities follow specific standards established by the Oregon Department of Fish and Wildlife, recognized through their own research. We are not aware of any alternative scientific procedure or technique that would be of significant benefit given current constraints of funding and time.

Conceptual projects were analyzed in the Water Optimization Study. The effects of the various project implementation scenarios on riverflows and stream temperatures were analyzed through simulation studies of the basin hydrology (BOR 1990 Supporting Vol I and II). Hydrologic and temperature models were prepared for the main stem to assist in the evaluation. The effects of individual element (project) implementation was also assessed for impacts on streamflow, temperature, sediment, fish, and other resources (e.g., crop production). Projects are selected using an interagency evaluation and prioritization process. Anticipated outcomes are weighed against costs to determine cost—benefit ratios for the proposed projects and alternatives.

The methodology for these projects is being designed, dynamically modified, and applied at the local level. However, it draws upon research conducted in the field of hydrology and engineering. Some of these resources are described in the paper "The Design and Construction of Infiltration Galleries" (Bennett 1970) and other geotechnical manuals.

Monitoring and evaluation of each project is committed as part of the agencies' (e.g., CTWS -- John Day Basin Office and Grant SWCD) annual monitoring program. Current monitoring on previously completed projects consists of visual assessments of post construction site conditions and acquisition of temperature and flow information. In addition, the 2000 monitoring plan proposes to monitor channel configuration, flow, temperature, fish species distribution, and riparian recovery. In order to evaluate sediment delivery within the project construction area, cross sectional channel measurements will be compared to the detailed pre-project engineering design drawings. Changes in channel configuration and estimates of sediment input can be calculated. Based on previous photo point monitoring at each constructed project, restoration of

stream bank vegetation has been extremely rapid. This indicates that sediment delivery is effectively controlled within one to two years of project implementation.

Instream construction follows guidelines established by the Oregon Department of Fish and Wildlife for timing considerations to protect migrating, spawning, and emerging fish. Standard methods of construction for protection of instream resources are followed to ensure minimization of acute effects to aquatic and terrestrial resources in the area of impact. Compliance with the National Environmental Policy Act, Endangered Species Act, and other mandates, through preparation of project level documents, provides additional assurances of and attention to biological protection requirements.

Risks to species from short term, acute construction impacts have been weighed against the long term risks of failing to complete restoration actions. In all cases, the risks and chronic impacts of not implementing the projects have been significantly higher to resources than the negligible effects of project activities.

**g. Facilities and equipment**

Construction equipment to be used varies depending upon site characteristics, materials to be installed, and site objectives. For example, the diversion projects use a trackhoe and loader to place rip-rap rock and a pump to dry the site for placement of concrete. Sites with additional excavation requirements may utilize a bulldozer as well. Equipment is readily available within the project areas.

Project design and data collection and analysis utilizes various engineering computer-aided design packages. Project monitoring will include application of microchip data loggers and computer analysis programs. This equipment is already present in the project offices.

**h. Budget**

Although BPA's cost-share contribution for these projects is currently 73%, the Tribes and GSWCD have been able to reduce Bonneville's contribution on past projects to less than 50%. We assert that the higher proportion of BPA's commitment for FY2000 is due to the request being prepared two years prior to implementation, which is considerably earlier than for other agencies. We believe that we will be successful in securing additional funds, whereby BPA's contribution could be reduced similar to what it has been in the past.

All personnel costs, and consequently fringe and indirect costs, are covered in other contracts. Similarly, the costs of NEPA and other compliance, travel, and contract administration are either provided for in other contracts or are cost-share contributions from other agencies. The Tribes have chosen this approach in order to maximize the accomplishment of restoration actions. All costs associated with operations and maintenance of the projects are the responsibility of the landowner under formal, signed agreements. Acceptance of operational responsibilities by the landowner is logical given that almost all of the project features are improvements of existing irrigation systems. Requiring landowner responsibility for maintenance of the projects is also necessary in order to provide the maximum amount of funds available on future projects and to ensure that landowners are committed to the project over the long-term.

Supplies, equipment, and costs for "other" items generally have been about 15, 5, and 7 percent of total project costs respectively, over the last five years of project implementation. Other costs include such items as point-of-diversion applications, water rights surveys, and similar. Some costs can fluctuate depending upon market availability and shipping. Modifications to project design, such as when surveys encounter cultural resources, can influence costs significantly. The

10% contingency (Construction-related support) has generally been sufficient to cover these items.

By far, the bulk of the funding request is for Subcontractor costs. This includes a wide range of items such as equipment rental, labor, equipment operators, shipping, and similar. As final engineering design, permits, NEPA and ESA consultation/compliance, surveys and the remainder of pre-construction tasks are completed, typically a portion of these funds shift to other categories, in particular to supplies. This is necessary since without the final design and configuration of each project, the actual amount of supplies and equipment can only be estimated.

## **Section 9. Key personnel**

Shaun Robertson -- Watershed Restoration Coordinator. (350 hours)  
B.S. Fisheries Science, Oregon State University (1990). Duties include contract and budget administration; technical assistance and coordination on projects; review, consultation, and compliance. Employed by Confederated Tribes of Warm Springs, manager of the John Day Basin Office. Over 12 years experience in fisheries management, specializing in habitat and watershed restoration and federal lands and treaty rights policy.

Lifelong resident of the basin and familiar with basin resource issues and concerns of the community. Represents Tribes on the Grant, Monument and Wheeler County Soil and Water Conservation Districts, South Fork Coordination Group, North Fork, Mid-John Day, and Wheeler Point Watershed Councils. Administers numerous successful grants and contracts from the Governor's Watershed Enhancement Board, BPA, and BOR.

## **Section 10. Information/technology transfer**

The GSWCD has contracted for the services of a support engineer. This has allowed the Tribes and GSWCD to implement additional projects each year, expanding our efforts into other subbasins. The Tribes also assist the North Fork Watershed Council and Monument SWCD in implementing similar projects on the North Fork John Day River. Technical assistance from the BOR and NRCS has provided for additional information exchange among the involved agencies.

In addition, other engineers and biologists from other basins have reviewed the projects completed in previous years. Their interest has been in taking this technology to their basins (e.g., Rogue River). We anticipate continuing this technology transfer in 2000. Numerous tours of completed projects were conducted in previous years, involving landowners, watershed councils, and agency staff, including the Governor's office. A project information sheet entitled "Partners in Water Conservation" is prepared following completion of each project. These are then distributed to interested individuals and groups throughout the basin. These educational efforts have resulted in increased awareness of water/riparian conservation efforts and generated additional interest in cooperative projects in other areas. The tour conducted with the North Fork Watershed Council has generated sufficient interest in the subbasin to warrant requesting additional technical assistance to plan projects in their area.

Information collected will be made available via Streamnet and informational reports will be available detailing project specifics. Site visits with government and private groups will be continue and information will be presented at watershed, range and fisheries workshops.

## **Congratulations!**

